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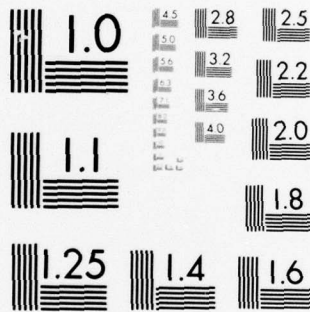
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6 EFFECT OF SURFACE AND AIR TRANSPORTATION
ON PETRI DISHES.

by

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ABSTRACT

Highly perishable petri dishes destined for use at distant locations can best be transported by air shipment using packaging procedures recommended in these studies.

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I. INTRODUCTION

Petri dishes used for biological assessment at remote testing sites can be prepared at the test location or can be prepared in previously established laboratories and shipped to the site. The latter method offers significant economies mainly from labor and construction costs. Shipment of prepared plates, whether by air or by surface, entails considerable packaging and handling. Air shipment subjects the packages of prepared petri dishes to varying environmental conditions effected by changes in barometric pressures. It must be noted, moreover, that the physical act of handling cardboard packages produces a pumping action of air into and out of the package. (This action can serve as a means of introducing contamination into the package). The petri dishes are generally packed as ten units in plastic bags, with fifty of the plastic bags per cardboard carton (shipping container).

II. MATERIALS AND METHODS

Slides were designed to determine the effects of surface (truck) and air transportation on petri dishes (150 x 15 mm) containing Casitone Agar. Also studied were the effects attributable to methods of closing the plastic bags and sealing of boxes. The two treatments were by truck and air shipments (separately) to California and return; all packages were returned by the respective method of shipment. After return to Baker Laboratory the packages were opened and all plates examined for contamination, excess moisture, excess drying and then were inoculated with 0.2 ml SM to evaluate the ability to support quantitative growth of simulants.

III. RESULTS AND DISCUSSION

Plates shipped by truck showed a greater amount of contamination than plates shipped by air. There was no appreciable difference in contamination levels between tied and sealed boxes shipped by truck. There appears to be no significant difference between plastic bag treatments for shipment by truck. These data are presented in Table I.

In the case of air shipment, sealed boxes offered better protection against contamination than was noted for tied boxes. There appeared to be no real differences among plastic bag treatments for air shipment. These data are presented in Table II.

Control data for plates not shipped are presented in Table III.

No significant differences were observed in the ability of the plates to quantitatively support growth of SM regardless of the treatment. These data are presented in Table IV. Neither excess moisture nor excess drying were evidenced on any of the plates of any treatment condition.

Table V presents a summary of contamination levels noted for all treatment conditions.

IV. SUMMARY

Aside from costing considerations not presented in this report, the recommended method for shipping prepared petri dishes is by air, and to contain the dishes in closed plastic bags packaged in sealed (taped openings) cardboard cartons.

TABLE I

Truck to California (Returned 1 July 1969)

	<u>Tied Box-A</u>			<u>Sealed Box-B</u>		
	<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>	<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>
Rep. 1	1/10 (1m)	2/10 (2m)	3/10 (1m)	0/10	5/10	1/10
Rep. 2	2/10 (2m)	2/10	3/10	5/10 (5m)	0/10	1/10 (1m)
Rep. 3	0/10	3/10 (2m) (1ss)	0/10	3/10	1/10	0/10
Totals	3/30 (3M)	7/30 (4m) (1ss)	6/30 (1ss) (1m)	8/30 (5m)	6/30	2/30 (1m)

m=mold

ss=sub-surface colonies

TABLE II

Air-freight to California (Returned 1 July 1969)

<u>Tied Box-A</u>			<u>Sealed Box -B</u>		
<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>	<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>
4/10	3/10	1/10	0/10	1/10	1/10
1/10	2/10	1/10	0/10	0/10	0/10
<u>0/10</u>	<u>0/10</u>	<u>2/10</u>	<u>1/10</u>	<u>0/10</u>	<u>4/10</u>
5/30	5/30	4/30	1/30	1/30	5/30

TABLE III

Shipping Controls (Stored in Room - Baker Laboratory)

<u>Tied Box-A</u>			<u>Sealed Box - B</u>		
<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>	<u>Tied-T</u>	<u>Sealed-S</u>	<u>Vented-V</u>
0/10	0/10	0/10	0/10	0/10	0/10
0/10	1/10	0/10	0/10	1/10	1/10
<u>0/10</u>	<u>0/10</u>	<u>1/10</u>	<u>0/10</u>	<u>0/10</u>	<u>0/10</u>
0/30	1/30	1/30	0/30	1/30	1/30

TABLE IV

Quality Control (All Plates Inoculated From the Same SM Suspension)

										<u>Average</u>	<u>Range</u>
I-A-T	209	215	220	241	247	220	227	214	253	$\frac{2046}{9}$	209-253
I-A-S	199	194	201	189	237	221	231	225	cont.	$\frac{1697}{8}$	189-237
I-A-V	198	220	188	236	224	216	239	205	222	$\frac{1948}{9}$	188-239
I-B-T	255	242	220	226	230	221	203	208	239	$\frac{2044}{9}$	203-242
I-B-S	222	244	212	223	253	cont.	234	255	221	$\frac{1864}{8}$	212-255
I-B-V	243	218	234	201	237	225	211	268	249	$\frac{2086}{9}$	201-268
II-A-T	232	238	246	230	223	238	219	221	218	$\frac{2065}{9}$	218-246
II-A-S	212	219	252	219	259	242	206	214	241	$\frac{2064}{9}$	206-259
II-A-V	238	225	258	242	240	236	233	226	247	$\frac{2145}{9}$	225-258
II-B-T	239	231	248	223	247	235	231	217	216	$\frac{2087}{9}$	216-248
II-B-S	214	233	207	258	195	222	240	214	260	$\frac{2043}{9}$	195-258
II-B-V	211	202	220	218	223	226	239	241	236	$\frac{2016}{9}$	202-241
III-A-T	218	269	234	224	234	233	218	222	232	$\frac{2084}{9}$	218-269
III-A-S	cont.	242	236	238	245	211	242	233	219	$\frac{1866}{8}$	211-245
III-A-V	242	230	222	226	234	227	231	231	238	$\frac{2081}{9}$	222-242
III-B-T	205	215	210	243	236	218	235	232	230	$\frac{2024}{9}$	205-245
III-B-S	257	240	231	227	195	210	229	239	210	$\frac{2038}{9}$	195-257
III-B-V	240	238	217	217	229	212	214	239	216	$\frac{2022}{9}$	212-239

A= Tied Box
V=Vented SleeveB= Sealed Box
I= TruckT=Tied Sleeve
II= AirS=Sealed Sleeve
III= Control (Not Shipped)

TABLE V

Treatment Total Number of Contaminated Plates

I.	32/180	A.	32/270
II.	21/180	B.	25/270
III.	4/180	T.	17/180
		S.	21/180
		V.	19/180

A = Tied Boxes
B = Sealed Boxes
T = Tied Bags
S = Sealed Bags
V = Vented Bags
I = Truck
II = Air
III = Control

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13. ABSTRACT Highly perishable petri dishes destined for use at distant locations can best be transported by air shipment using packaging procedures recommended in these studies. KEY WORDS: Petri dishes Transportation Packaging Remote laboratory support			

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